

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the present application.

5

Listing of Claims:

Claim 1 (withdrawn): A method for continuous amplification of DNA, the method repeating DNA amplification reactions continuously by:

10 with a recirculation path and a pump furnished in the recirculation path, feeding unidirectionally through the recirculation path a reaction mixture containing DNA fragments and a reagent solution, held in a reaction-mixture tank;

 sending the reaction mixture within the recirculation path by way of, in order, a denaturing isothermal tank wherein a temperature for dissolving apart the DNA's double strands is maintained, an annealing isothermal tank wherein a temperature
15 at which primers contained in the reagent solution anneal to the DNA fragments is maintained, and an elongation isothermal tank wherein a temperature at which complementary chains are extended continuously onto the primers is maintained; and

20 with heat-exchange fluids within the isothermal tanks, maintaining the reaction mixture for predetermined times at predetermined temperatures, and subsequently recirculating the reaction mixture into the reaction-mixture tank.

Claim 2 (withdrawn): The DNA continuous amplification method set forth in claim 1, wherein the amplification reactions are performed by making time for
25 heat-exchange in the denaturing isothermal tank a reference time, and setting individual heat-exchange times in the annealing isothermal tank and the elongation isothermal tank as multiples of the reference time.

Claim 3 (withdrawn): A method for continuous amplification of DNA, the method repeating DNA amplification reactions continuously by:

circuit-feeding unidirectionally through an endless recirculation path, using a pump provided therein, a reaction mixture containing DNA fragments and a reagent solution, held within the recirculation path;

circulating the reaction mixture within the recirculation path by way of, in order, a denaturing isothermal tank wherein a temperature for dissolving apart the DNA's double strands is maintained, an annealing isothermal tank wherein a temperature at which primers contained in the reagent solution anneal to the DNA fragments is maintained, and an elongation isothermal tank wherein a temperature at which complementary chains are extended continuously onto the primers is maintained; and

with heat-exchange fluids within the isothermal tanks, maintaining the reaction mixture for predetermined times at predetermined temperatures.

Claim 4 (currently amended): An apparatus for continuous amplification of DNA, comprising:

a reaction-mixture tank for holding a reaction mixture containing DNA fragments and a reagent solution;

a denaturing isothermal tank made up of a container body for holding a heat-exchange fluid, a heating device for heating the heat-exchange fluid to, and retaining it at, adjusted to a prescribed temperature for dissolving apart the DNA's double strands, and a stirring device for stirring the heat-exchange fluid;

an annealing isothermal tank made up of a container body for holding a heat-exchange fluid, a heating device for heating the heat-exchange fluid to, and retaining it at, adjusted to a prescribed temperature at which primers contained in

the reagent solution anneal to the DNA fragments, and a stirring device for stirring the heat-exchange fluid;

an elongation isothermal tank made up of a container body for holding a heat-exchange fluid, a heating device for heating the heat-exchange fluid to, and
5 retaining it at, adjusted to a prescribed temperature at which complementary chains are extended continuously onto the primers, and a stirring device for stirring the heat-exchange fluid;

a recirculation-path system through which the reaction mixture in the reaction-mixture tank is fed and guided, the recirculation-path system including a
10 coiled heat-exchange section immersed into the denaturing isothermal tank, a coiled heat-exchange section immersed into the annealing isothermal tank, and a coiled heat-exchange section immersed into the elongation isothermal tank, the recirculation-path system therein ~~being arranged such that it circuits to circuit from and back to~~ the reaction-mixture tank ~~and goes by way of the denaturing~~
15 ~~isothermal tank, the annealing isothermal tank, and the elongation isothermal tank back to the reaction-mixture tank~~ by way of the respective coiled sections immersed into the denaturing, annealing and elongation isothermal tanks and connected by intervening out-of-tank sections; and

an intermittent-feed pump working to feed the reaction mixture ~~[[in]]~~
20 unidirectionally through said recirculation-path system ~~unidirectionally through it~~; wherein the apparatus is configured such that to maintain the reaction mixture in said ~~recirculation-path system~~ is for timed intervals maintained at the prescribed temperatures determined by the heat-exchange fluids in the isothermal tanks.

Claim 5 (canceled)

Claim 6 (currently amended): The DNA continuous amplification apparatus set forth in claim 4, wherein ~~said denaturing isothermal tank, said annealing isothermal tank, and said elongation isothermal tank each respectively~~ include:

- 5 ~~a container body for holding the heat-exchange fluid;~~
- ~~a stirring device for stirring the heat-exchange fluid; and~~
- a each heating device ~~containing~~ includes a pump for circuit-feeding the heat-exchange fluid in between the container body and the heating device, and a heat source for heating the heat-exchange fluid to and retaining it at prescribed
- 10 temperatures, wherein said heating device supplies the heat-exchange fluid to said container body.

Claim 7 (original): The DNA continuous amplification apparatus set forth in claim 4, wherein a plurality of said recirculation-path systems in parallel is provided along with said pump between the reaction-mixture tank and said container bodies.

15 **Claim 8 (canceled)**

Claim 9 (original): The DNA continuous amplification apparatus set forth in claim 6, wherein a plurality of said recirculation-path systems in parallel is provided along with said pump between the reaction-mixture tank and said container bodies.

Claim 10 (original): The DNA continuous amplification apparatus set forth

20 in claim 4, further comprising:

 a plurality of sets of said denaturing isothermal tank, said annealing isothermal tank, and said elongation isothermal tank; and

 a plurality of said recirculation-path systems in parallel, provided along with said pump between the reaction-mixture tanks and the isothermal tanks of said

25 plurality of sets.

Claim 11 (original): The DNA continuous amplification apparatus set forth in claim 5, further comprising:

a plurality of sets of said denaturing isothermal tank, said annealing isothermal tank, and said elongation isothermal tank; and

5 a plurality of said recirculation-path systems in parallel, provided along with said pump between the reaction-mixture tanks and the isothermal tanks of said plurality of sets.

Claim 12 (original): The DNA continuous amplification apparatus set forth in claim 6, further comprising:

10 a plurality of sets of said denaturing isothermal tank, said annealing isothermal tank, and said elongation isothermal tank; and

a plurality of said recirculation-path systems in parallel, provided along with said pump between the reaction-mixture tanks and the isothermal tanks of said plurality of sets.

15 **Claims 13-17 (canceled)**